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Mathematics 6

Module 1

**Home Instructor's Guide
and Assignment Booklet**

1A




**Learning
Technologies
Branch**

Alberta
LEARNING

Mathematics 6
Module 1: Estimating and Representing Number
Home Instructor's Guide and Assignment Booklet 1A
Learning Technologies Branch
ISBN 0-7741-2180-7

The Learning Technologies Branch acknowledges with appreciation the Alberta Distance Learning Centre and Pembina Hills Regional Division No. 7 for their review of this Home Instructor's Guide and Assignment Booklet.

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Students	✓	
Teachers	✓	
Administrators		
Home Instructors	✓	
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Mathematics 6 Course Overview

The nine modules in the Mathematics 6 course and the accompanying Assignment Booklets have been developed so that the student becomes involved in a variety of learning tasks that helps him or her develop mathematical skills, learn how to communicate mathematically, and become a mathematical problem solver.

Modules

There are nine Student Module Booklets for this course. The modules are designed to be worked through in order (from 1 to 9) because once concepts and skills have been introduced in a module, they will be reinforced, extended, and applied in subsequent modules.

Each lesson focuses on a big idea that is central to the topic being learned, and the activities address various aspects of that big idea. The last activity in each lesson is a Challenge Activity, which is optional.

At the end of some of the activities, the student is asked to share what he or she is learning with the home instructor. Answers to these Sharing Time exercises are provided in the Home Instructor's Guides. You may wish to schedule additional sharing times to discuss the student's progress and review previously developed skills.

Following the Module Summary in each module, there are four special activities: Keystrokes, Review, Just the Facts, and Mental Math. These activities provide the student with an opportunity to practise important ideas from that module. In the Review, the student is given some choice as to which questions he or she wishes to complete; you should discuss these choices with the student. If more practice is needed, encourage him or her to do more of the questions provided. You may choose to have the student complete the review later in the course in preparation for the final test.

Mathematics 6 Companion CD

Included with the module package is the Mathematics 6 Companion CD. This CD contains interactive lessons and additional practice that review and reinforce the skills and concepts developed in the Student Module Booklets. These lessons are referenced in the Review exercise of each module. The student should be encouraged to complete these lessons at the end of each module and at the end of the course to prepare for the final examination.

These lessons are also available on the Internet at the following website:

<http://www.learnalberta.ca/Math/default.asp>

Assignments

Lesson assignments are provided for this course. When completing the assignments, the student may refer to the Student Module Booklets, but he or she should answer the questions in the lesson assignments independently. This will ensure that the teacher acquires a more accurate picture of the student's ability and understanding.

If the student is having difficulties, you may wish to review the appropriate lessons in the Student Module Booklet with the student and encourage him or her to explain, describe, or demonstrate (using manipulatives, drawings, and so on) his or her understanding of a particular concept or idea.

A broad range of assessment tools will be used to gather information to provide the teacher with a more complete picture of the student's knowledge and understanding of curriculum skills and concepts. It is important that the teacher learns how the student thinks about mathematics as well as what concepts and skills the student has mastered. Lesson assignment questions, performance assessments, observations by the home instructor, and student self-assessment pages may all be used. As well, there is a final test.

Textbooks

In addition to the distance learning materials, the following books are needed. These books are available from the Learning Resources Centre (LRC).

- the hardcover Mathematics 6 textbook, called *Quest 2000: Exploring Mathematics: Grade 6*, published by Addison-Wesley (LRC product number 339970)
- the softcover Practice and Homework Book for *Quest 2000: Exploring Mathematics: Grade 6*, published by Addison-Wesley (LRC product number 390823)

Manipulatives

Your student will be using manipulatives (hands-on learning aids) to develop and reinforce many math concepts. Manipulatives are also useful when your student is sharing or discussing with you what he or she has learned.

Students will need to have access to the following mathematics manipulatives, which are available from the Learning Resources Centre (LRC):

- pattern blocks (LRC product number 161901)
- base ten blocks (LRC product number 464397)

Calculators

A basic four-function calculator is required for many of the activities in Mathematics 6. The TI-108 calculator is recommended. It is available from the Learning Resources Centre (LRC product number 450164).

It is important to remember that a calculator is a tool to be used when doing difficult calculations and when investigating what numbers can do. Watch that the student doesn't rely on the calculator for calculations or estimations that he or she should be doing mentally. Both of these activities rely upon mastering the basic number facts.

Computers

If you have a computer at home, the student may already know some computer software programs that reinforce the learning of math ideas and skills. There are also many websites on the Internet that provide math activities for students to do. Throughout this course, optional activities should be done only when the lesson activities are completed.

Note: Remind the student always to check with you before logging onto the Internet. Remember that any Internet website address given in the modules is subject to change.

Module 1: Estimating and Representing Number

Overview

In Module 1 the student explores how large whole numbers greater than 1 million are used to describe distances, populations, and money. He or she also explores how decimal fractions are used to represent batting averages and to measure microscopic objects and organisms. The student will represent numbers with models and place-value charts and review place value by reading, writing, comparing, ordering, and rounding numbers. The student will be introduced to integers and see how they are used to measure things like temperature and land elevation and to represent ratings in opinion polls.

Assessment

At the end of each of the lessons in Module 1, the student will be directed to complete an assignment in one of the two Assignment Booklets. The assignments will be graded by the teacher and have a total value of 90 marks.

The student is also expected to complete the Numbers in the News project. This project has a value of 10 marks. Encourage the student to look through a newspaper at least once a week for items on the Scavenger Hunt list. Read through the list with your student and suggest that he or she begin collecting samples of the ideas that he or she already understands. Other samples can be collected as ideas are introduced or extended in the module. Encourage your student to collect as many samples as he or she wishes. At the end of the module, the student will need to choose at least one sample for each question and submit the samples with the Assignment Booklet.

Pacing

The module has been designed so that the student can work at his or her own pace. Each lesson, including the lesson assignment, will take the average student about one week to complete. The Challenge Activity in each lesson is optional.

Allowing extra time for review of basic facts and project work, Module 1 will take 3 to 4 weeks to complete.

Lesson 1: Understanding Large Numbers

Overview

In this lesson the student explores how numbers greater than 1 million are often needed to describe distances in space, populations, and money. The student will extend understanding of large whole numbers by making models and by using place-value charts to represent them. The student will review place value by reading, writing, comparing, ordering, and rounding large numbers.

Special Requirements

The following materials are required for Lesson 1:

- metre-stick
- a 1-m³ object
- modelling clay
- index cards
- newspaper
- tape
- centicubes (or small base ten cubes)

Sharing Time

There is one Sharing Time exercise in this lesson—at the end of Activity 3.

Activity 3 Sharing Time

Practice and Homework Book, page 14, questions 1 to 9

1. 4 600 000
2. 1 700 000 000
3. 1 500 000
4. 7 300 000 000

5. 1 400 000
6. three million six hundred forty-seven thousand two hundred twenty-seven
7. two billion three hundred sixty-one million five hundred seventy-six thousand two hundred twelve
8. twenty five million six hundred thirty-six thousand two hundred eight
9. forty-five thousand three hundred ninety-six

Lesson 2: Making Sense of Small Numbers

Overview

In this lesson the student explores how small numbers can be used to represent batting averages and to measure microscopic objects. The student extends his or her understanding of decimals by using base ten blocks and place-value charts to represent them. The student reviews place value by reading, writing, comparing, ordering, and rounding decimals.

Special Requirements

The following materials are required for Lesson 2:

- base ten blocks
- calculator


Sharing Time

There is one Sharing Time exercise in this lesson—at the end of Activity 3.

Activity 3 Sharing Time

Practice and Homework Book, page 18, questions 1 to 6

1. 0.042
2. 0.213
3. 2.304
4. 1.43
5. 0.485, 0.493, 1.267
6. 0.301, 0.304, 0.326



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ASSIGNMENT BOOKLET 1A

PAT0610 Mathematics 6

Module 1: Lesson 1 Assignment and Lesson 2 Assignment

Home Instructor's Comments and Questions

Home Instructor's Signature

FOR SCHOOL USE ONLY

Assigned Teacher:

Date Assignment Received:

Grading:

Additional Information:

FOR HOME INSTRUCTOR USE (if label is missing or incorrect)

Student File Number:

Date Submitted:

Apply Module Label Here

Name

Address

Postal Code

*Please verify that preprinted label is for
correct course and module.*

Teacher's Comments

Teacher's Signature

Home Instructor: Keep this sheet when it is returned to you as a record of the student's progress.

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- Are all the assignments completed? If not, explain why.
- Has your work been reread to be sure the spelling and details are correct?
- Is the record form filled out and the correct module label attached?

MAILING

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Send all letters in a separate envelope.

2. Postage Rates

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FAXING

1. Assignment Booklets may be faxed. Contact your teacher for the fax number.
2. All faxing costs are the responsibility of the sender.

E-MAILING

Assignment Booklets may be e-mailed. Contact your teacher for the e-mail address.

The background is a dark, textured space filled with various celestial and technological elements. In the top left, a satellite with two large rectangular solar panels is shown. To its right is a rocket ship with a circular nose cone and a long, pointed tail. Further right is a large, complex satellite structure with multiple panels. In the center, a sleek, pointed spacecraft is shown in flight. To the left of the center is a large, multi-segmented rocket or space station component. Below that is a planet with a prominent ring system. In the bottom left, there is a small, cratered sphere resembling the Moon. In the bottom center, a satellite with two rectangular solar panels is shown. To its right is a large, textured sphere resembling a planet. In the top right, a large, complex satellite structure is shown. In the center right, a small, detailed astronaut in a full space suit is standing. The entire scene is filled with numerous small, four-pointed stars of varying sizes.

Mathematics 6

Module 1

**Assignment Booklet 1A:
Estimating and Representing
Number**



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Summary

	Total Possible Marks	Your Mark
Lesson 1 Assignment	30	
Lesson 2 Assignment	30	
	60	

Teacher's Comments

Mathematics 6
Module 1: Estimating and Representing Number
Assignment Booklet 1A
Learning Technologies Branch

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ASSIGNMENT BOOKLET 1A

MATHEMATICS 6—MODULE 1: ESTIMATING AND REPRESENTING NUMBER

Your mark for this module will be determined by how well you do your assignments in the Assignment Booklets.

There are two lesson assignments in this Assignment Booklet. The total value of these assignments is 60 marks. The value of each question is stated in the left margin.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate lessons.

Be sure to proofread each assignment carefully.

30

Lesson 1 Assignment: Understanding Large Numbers

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.



Turn to page 49 in your textbook. Use the information in the table to answer questions 1 and 2.

4

1. Write the four greatest numbers from the table in words.

- _____

- _____

- _____

- _____

2. Estimate each of the following and show how you get your answer.

③

a. About how many times faster than a cheetah is the speed of light?

③

b. About how many times faster than a horsefly is the Apollo 10 command module?



Turn to pages 54 and 55 in your textbook. Use the information given in the tables to answer questions 3 to 5.

3. Use the data given in the table Approximate Mass in Kilograms.

①

a. Which item has about twice the mass of the tractor?

①

b. Which item has about 6 times the mass of the tractor?

4. Use the data given in the table World Population Estimates 1992.

②

a. Write the populations in order, from least to greatest.

- ③ b. Find two populations such that one is about 10 times greater than the other. Explain why you chose those two populations.
-
-
-
-

5. Use the data given in the table Areas of the Bases of Buildings.

- ③ a. Find two buildings such that the area of one is about 20 times greater than the area of the other. Explain why you chose those two buildings.
-
-
-
-

- ② b. The area of Myra's house is about 112 m^2 . Which building has an area about 200 times greater than the area of Myra's house? Explain.
-
-
-
-

6. At 4:00 P.M. on his eleventh birthday, Jon said he was 347 133 625 s old.

②

- a. Draw counters on the following place-value chart to represent his age in seconds.

Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands

Hundreds	Tens	Ones

②

- b. Write Jon's age in seconds as an expanded numeral.

- ② 7. a. Show how you would regroup the counters on the following place-value chart. Use the blank chart to show your answer.

Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands
● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ● ● ●	●		● ● ● ● ● ● ● ●

Hundreds	Tens	Ones
● ● ● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ● ● ●

Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands

Hundreds	Tens	Ones

- ② b. Write the number in standard form.

30

Lesson 2 Assignment: Making Sense of Small Numbers

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.



1. Turn to pages 38 and 39 in your textbook. Use the information given in the pictures to answer the following questions.

②

- a. Write the masses of the six animals in order, from least to greatest.

②

- b. Look at the pattern of numbers formed by your answer to the previous question. About how many times greater is each mass than the one before it?

②

- c. About how many times greater than the mass of the lightest animal is the mass of the heaviest animal? Explain how you can use your answer to question 1.b. to decide.

②

- d. What fraction of the mass of the heaviest animal is the mass of the lightest animal? Explain how you can use your answer to question 1.c. to decide.



2. Turn to page 54 in your textbook. Use the information given in the table Foreign Currency per Canadian Dollar to answer the following questions.

①

- a. Write the greatest rate shown for the Australian dollar.

①

- b. Write the least rate shown for the Belgian franc.

④

- c. Round each of the rates shown for the Austrian schilling to the nearest thousandth.

②

- d. Write the Monday rate for the Australian dollar in words in two different ways.



3. Turn to page 49 in your textbook. Use the information in the table Approximate Speeds to answer the following questions. Explain your reasoning.

②

- a. How many times faster than the speed of the ocean floor splitting is the speed of bamboo growth?

②

- b. How many times faster than the speed of a glacier flow is the speed of a snail?

②

- c. How many times faster than the speed of a snail is the speed of a tortoise?

4. The following table shows the batting averages of some all-time leaders before the numbers were rounded. Use the data in the table to answer the following questions.

Name	Batting Average	Rounded Batting Average (to hundredths)
Tris Speaker	0.344 67	
John McGraw	0.333 58	
Pete Browning	0.341 49	
Ed Delahanty	0.345 90	
Jesse Burkett	0.338 43	
Willie Keeler	0.341 28	

②

- a. Complete the table by rounding each number to the nearest hundredth.

③

- b. Write the greatest rounded number in words and as an expanded numeral.

Words: _____

Expanded numeral: _____

- ③ c. Write the least rounded number in words and as an expanded numeral.

Words: _____

Expanded numeral: _____



Mathematics 6

Module 1

**Home Instructor's Guide
and Assignment Booklet**

1B



**Learning
Technologies
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Alberta
LEARNING

Mathematics 6
 Module 1: Estimating and Representing Number
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Lesson 3: Integers

Overview

In this lesson the student investigates integers and sees how they are used to measure things like temperature, elevations above sea level, and depths below sea level. The student explores the use of integers in opinion poll ratings.

Special Requirements

No special materials are needed for Lesson 3.

Sharing Time

There is one Sharing Time exercise in this lesson—at the end of Activity 2.

Activity 2 Sharing Time

Practice and Homework Book, page 59, questions 1 to 10

1. 47°C
2. 46°C
3. 53°C
4. 66°C
5. 67°C
6. Yellowknife, Saskatoon, St. John's, Victoria, Waterloo
7. -4°C , 0°C , 8°C
8. -13°C , -9°C , 14°C
9. -2°C , 5°C , 9°C
10. -27°C , -3°C , 6°C

ASSIGNMENT BOOKLET 1B

PAT0610 Mathematics 6

Module 1: Lesson 3 Assignment and Numbers in the News Project

Home Instructor's Comments and Questions

Home Instructor's Signature

FOR SCHOOL USE ONLY

Assigned Teacher:

Date Assignment Received:

Grading:

Additional Information:

FOR HOME INSTRUCTOR USE (if label is missing or incorrect)

Student File Number:

Date Submitted:

Apply Module Label Here

Name

Address

Postal Code

*Please verify that preprinted label is for
correct course and module.*

Teacher's Comments

Teacher's Signature

Home Instructor: Keep this sheet when it is returned to you as a record of the student's progress.

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E-MAILING

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The background is a dark space-themed illustration. It features a variety of celestial objects and spacecraft: a satellite with solar panels in the top left, a rocket with a flame trail in the top center, a large satellite component in the top right, a planet with rings (Saturn) on the left, a large rocket ship in the center-left, a small astronaut in a spacesuit on the right, a planet with craters (the Moon) in the bottom left, and a satellite in the bottom center. Numerous stars of different sizes are scattered throughout the scene.

Mathematics 6

Module 1

**Assignment Booklet 1B:
Estimating and Representing
Number**



**Learning
Technologies
Branch**

Alberta
LEARNING

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Lesson 3 Assignment	30	
Numbers in the News Project	10	
	40	

Teacher's Comments

Mathematics 6
Module 1: Estimating and Representing Number
Assignment Booklet 1B
Learning Technologies Branch

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ASSIGNMENT BOOKLET 1B

MATHEMATICS 6—MODULE 1: ESTIMATING AND REPRESENTING NUMBER

Your mark for this module will be determined by how well you do your assignments in the Assignment Booklets.

There is one lesson assignment and a Numbers in the News project in this Assignment Booklet. The total value of the lesson assignment is 30 marks. The Numbers in the News project is worth 10 marks. The value of each question is stated in the left margin.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate lessons.

Be sure to proofread each assignment carefully.

30

Lesson 3 Assignment: Integers

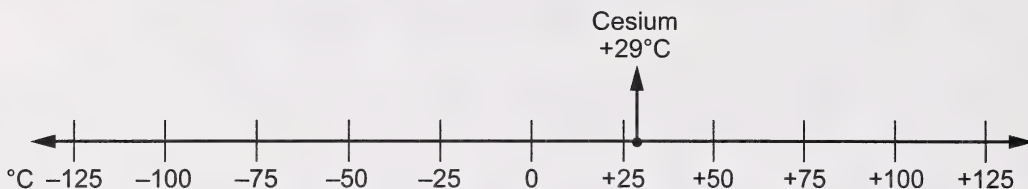
Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

8

1. The melting points of some elements are shown in the following table.

Element	Melting Point (°C)
Mercury	– 39
Radon	– 71
Sodium	+ 98
Phosphorus	+ 44
Chlorine	– 101
Potassium	+ 64
Bromine	– 7
Iodine	+ 114
Cesium	+ 29

Mark and label the melting points on the number line. Cesium has been done for you.



2. Use the number line in question 1 to answer questions 2.a. to 2.c.
Explain your reasoning.

②

- a. Which is lower, the melting point of potassium or the melting point of mercury? By how much?

②

- b. Which is higher, the melting point of bromine or the melting point of radon? By how much?

②

- c. Which is higher, the melting point of cesium or the melting point of chlorine? By how much?

②

- d. Which is higher, the melting point of iodine or the melting point of phosphorus? By how much?

3. For each of the following questions, draw and label a number line, and explain how you used it to find the temperature.

③

- a. The temperature represented by an integer that is

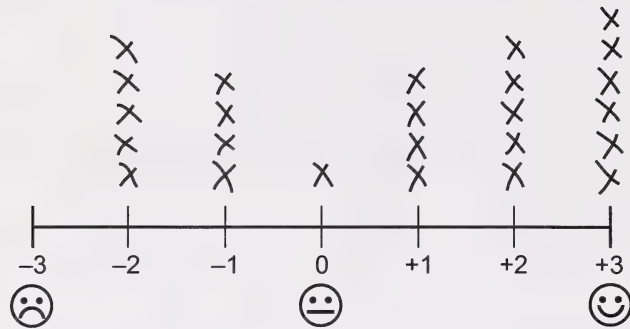
- less than -3°C
- greater than -8°C
- farther from -8°C than it is from -3°C

③

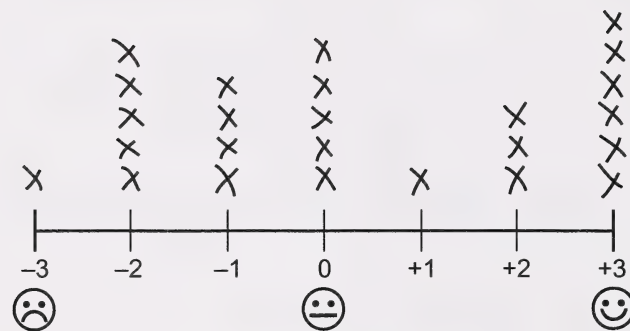
- b. The melting point of cottonseed oil is represented by an integer that is

- less than $+25^{\circ}\text{C}$
- greater than -3°C
- as close to $+25^{\circ}\text{C}$ as it is to -3°C

4. Yvonne asked some people at a community picnic to rate their preference for pink lemonade and for fruit punch. Her results are shown on the following line plots.



Fruit Punch



Pink Lemonade

- 2 a. Which integers on the number lines show that people like the drinks?

- 1 b. Which integer shows the strongest dislike for the drinks?

①

c. What does the integer 0 show?

②

d. How many people in total dislike pink lemonade? Show how you got your answer.

②

e. How many people in total liked fruit punch? Show how you got your answer.

⑩

Numbers in the News

Go through the Scavenger Hunt list for Module 1 to make sure you have clipped at least one example for each item. Ask your home instructor to check the samples you found. Choose the samples you wish to use, and label each one with the name of the scavenger hunt item it matches. Organize your samples and put them together with any other information required. Submit your project with this Assignment Booklet.

Ask yourself the following questions:

- Is my Numbers in the News project complete? (Have I included all my samples?)
- Do my samples show the ideas clearly? (Are my examples appropriate?)
- Did I take care to be neat when organizing and labelling my work?

1

2

3

101

